

REMARKS

After the foregoing amendment, claims 1-4, as amended, are pending in the application. Claims 1 and 3-4 have been amended to more particularly point out and distinctly claim the subject matter which Applicants regard as the invention. Applicants submit that no new matter has been added to the application by the Amendment.

Objection to the Abstract

The Examiner objected to the Abstract as not being commensurate with the now claimed invention. Applicants have replaced the Abstract with a new Abstract commensurate with the now claimed invention. Accordingly, Applicants respectfully request reconsideration and withdrawal of the objection to the Abstract.

Objection to the Specification

The Examiner objected to title as not being descriptive. Applicants have replaced the title with a new title which is descriptive of the claimed invention. Accordingly, Applicants respectfully request reconsideration and withdrawal of the objection to the title.

The Claimed Invention

Disk drives for recording and reproducing information from interchangeable disks generally employ a turntable for applying rotary motion to the disk and a clamper for holding the disk to the turntable. As described in the application starting at page 148, vibration of the disk is a serious problem in disk drives, particularly when the disk is rotated at a high speed. As described at pages 156-159 of the application, a main factor in causing vibration in a conventional disk drive apparatus was found by the Applicants to be unevenness of the disk holding face of the clamper. Also, Applicants determined that even with a perfectly flat clamper surface, foreign substances such as dust, hair and litter could enter the space between the disk and the clamper and cause the vibration. Applicants further determined that a typical clamper contacted the disk at only three points (see Fig. 50) instead of the entire face of the clamper.

Applicants subsequently determined, as described at pages 159-174 and Figs. 55-59 that disk vibration could be substantially reduced by: (1) contacting the disk with four or more projections mounted either on the clamper, the turntable, or on both the clamper and the

turntable, and (2) maintaining the differences in the height of the projections to be within 40 micrometers.

Rejection - 35 U.S.C. § 102

The Examiner rejected claim 1 under 35 U.S.C. § 102 as being unpatentable over U.S. Patent No. 6,292,461 (Kikuchi et al.). The Examiner states that Kikuchi et al. discloses a disk drive apparatus including positioning means, a turntable and a clamper, each of which turntable and clamper having four or more projections, each of which projections having a predetermined height, being arranged in opposite positions around the circumference in equal intervals, and having tips in substantially the same plane. Applicants respectfully traverse the rejection.

Applicants have amended claim 1 to require that the differences in height of the projections be held within 40 μm . Claim 10 now recites:

1. *A disk drive apparatus comprising:
a turntable having four or more projections each of which has predetermined height, which are arranged at positions wherein a circumference is divided at equal intervals, and the tips of which are substantially on the same plane, for supporting a mounted disk by using said four or more projections;
a clamper having four or more projections each of which has predetermined height, which are arranged at positions wherein a circumference is divided at equal intervals, and holding said disk between these projections and the projections on said turntable; and
positioning means for holding said disk between the projections on said turntable and the projections on said clamper disposed opposite to each other, wherein
the differences (flatness) in height among said projections of said turntable are within 40 μm , and
the differences (flatness) in height among said projections of said clamper are within 40 μm .*

Kikuchi et al. is directed to a disk drive 301 including a disk 1 housed in a cartridge 4. The disk 1 includes a main body 2 and a center hub 3. The center hub 3 includes upper and lower hubs 11, 12 for holding the main body 1 by attaching the upper and lower hubs together with a screw 13 through the open center of the disk. The center hub 3 mates with a

spindle 304 and disk table 305 of the disk drive. In several embodiments, the hubs 11, 12 are shown with protrusions 22, 23 for contacting the main body 2 of the disk 1. The end faces of the protrusions are described as having "equalized heights" for the purpose of improving the positional accuracy of the disk body (col. 5, line 65 to col. 4, line 6).

Applicants first submit that the Examiner has mischaracterized Kikuchi et al. by equating the upper hub 11 and the lower hub 12 with respectively, a clamper and a turntable.

As well known, a turntable and a clamper are components of a disk drive for respectively driving/supporting and holding a removable disk in a disk drive, whereby: (1) the turntable is integral to the drive mechanism of the disk drive for transferring rotational motion directly from the drive mechanism to the disk and (2) the clamper provides a releasable force to hold the disk to the turntable.

Applicants submit that the upper hub 11 and the lower hub 12 do not perform the functions of a turntable and clamper. As clearly stated at col. 3, lines 21-28 and 49-53 and shown in Fig. 2, the upper hub 11 and the lower hub 12 are components of the disk 1, which is a completely separate assembly from the disk drive 301. Further, the lower hub 12 is not a turntable. Figure 2 of Kikuchi clearly shows that one of ordinary skill in the art would consider the turntable to be the disk table 503/spindle 304. The lower hub 12 sits on and is driven by the disk table 305 and the spindle 304 (i.e. turntable), and therefore can not be equated with a "turntable". Further, as made clear in Figs. 1-30, neither the disk table 305 nor the spindle 304 (i.e. the turntable) include four or more projections. Additionally, the upper hub 11 is fastened to the lower hub 12 by a screw 13 and thus does not provide a releasable holding force as does a clamper. Consequently, Kikuchi et al. can not be said to disclose a turntable and a clamper having four or more projections as recited in claim 1.

Further, Kikuchi et al. does not teach or suggest that the differences in the heights of the projections are held to less than 40 micrometers as recited in amended claim 1. Kikuchi et al. merely states that the height of the protrusions 22 are equalized for providing positional accuracy and a sure and firm holding of the disk. Such a statement of equal heights is meaningless unless a tolerance of the equality is stated, since it is not possible in the real word to make the heights absolutely "equal". Further, Kikuchi et al. would not have a motivation for

holding the differences in the projection height to less than 40 μm . since Kikuchi et al. merely requires an improvement in positional accuracy and does not address vibration.

Applicants submit that for all the above reasons that Kikuchi et al. does not anticipate amended claim 1. Accordingly Applicants respectfully request reconsideration and withdrawal of the §102 rejection of claim 1.

Rejection - 35 U.S.C. § 103

The Examiner rejected claims 3 and 4 under 35 U.S.C. § 103 as being unpatentable over Kikuchi et al. in view of U.S. Patent No. 5,809,002 (Takahashi et al.). Applicants respectfully traverse the rejection.

The Examiner states that Kikuchi et al. discloses all the elements of claims 3 and 4 except for disclosing the use of the projections and frictional body in the same embodiment and [the frictional body] being rubber. The Examiner states that Takahashi et al. suggests "other soft material having viscous and elastic properties may also be utilized" [for the frictional body] and it would be considered that rubber would be encompassed by that description. The Examiner further states it would have been obvious to one having ordinary skill in the art at the time of the invention to modify the clamper of Kikuchi et al. so that it would include the elastic material disclosed by Takahashi. Applicants respectfully traverse the rejection.

Amended claim 3 recites a clamper having four or more projections having a difference in height of less than 40 μm . and a ring shaped rubber sheet stuck to a disk mounting face of the turntable. Amended claim 4 recites a turntable having four or more projections having a difference in height of less than 40 μm . and a ring shaped rubber sheet stuck to a disk mounting face of the clamper.

Applicants submit, as discussed above, that Kikuchi et al. does not disclose a turntable or a clamper. Further, as discussed above, Applicants further submit that there is no teaching or suggestion in Kikuchi et al. of projections on either a turntable or a clamper having a difference in height of less than 40 μm . as recited in claims 3 and 4.

Takahashi et al. does not overcome the foregoing deficiencies. Further, claims 3 and 4 recite a rubber sheet stuck to a disk mounting face. Takahashi et al. teaches a film or

coating 100 of a urethane resin in which a plurality of fine particles have been dispersed, mounted by spraying, coating or electro-deposition. Applicants are unable to find any reference in Takahashi et al. that suggests any other material than synthetic resin. Applicants submit that synthetic resin with fine particles dispersed within is not rubber and that a coating mounted by spraying coating or electro-deposition is not a sheet stuck to a disk mounting surface.

For all the foregoing reason, Applicants submit that the combination of Kikuchi et al and Takahashi et al. does not make claims 3 and 4 obvious. Accordingly Applicants respectfully request reconsideration and withdrawal of the §103 rejection of claims 3 and 4.

Rejection - 35 U.S.C. § 103

The Examiner rejected claim 2 under 35 U.S.C. § 103 as being unpatentable over Kikuchi et al. in view of U.S. Patent No. 6,198,715 (Kouno et al.) and further in view of U.S. Patent No. 6,295,269 (Takeuchi et al. The Examiner states that Kikuchi et al. fails to disclose a disk device including a sub-base, a main base and a balancer having arc shaped tracks having a central angle of less than 360 degrees. The Examiner further states that Kouno et al. discloses a sub-base, a main base and a plurality of arcs having balancing members but is silent as to limiting movement of the balancing members. The Examiner cites Takeuchi et al. for having a plurality of arcs having a central angle of less than 360 degrees. Applicants respectfully traverse the rejection.

Kikuchi et al. discloses a disk drive 301 including a spindle 304 and a disk table 305 mounted to the spindle. Kikuchi et al. also discloses a disk 1 having an upper hub 11 and a lower hub 12. Applicants submit, as discussed above that the upper hub 11 and the lower hub 12 are not components of a disk drive as required by claim 2 nor can they be characterized as a turntable and a clamper. As clearly stated at col. 3, lines 21-28 and 49-53 and shown in Fig. 2, the upper hub 11 and the lower hub 12 are components of the disk 1, which is a completely separate assembly from the disk drive 301. Further, the lower hub 12 is not a turntable because it is not used as a driving component of the disk that is integral to the disk drive. Figure 2 of Kikuchi clearly shows that one of ordinary skill in the art would consider the turntable to be the disk table 503/spindle 304. The lower hub 12 sits on and is rotated by the disk table 305 and the

spindle 304 (i.e. turntable), and therefore can not be equated with a "turntable". Additionally, the upper hub does not provide a releasable holding force as does a clamper. Further, as made clear in Figs. 1-30, neither the disk table 305 nor the spindle 304 includes four or more projections. Consequently, Kikuchi et al. can not be said to disclose a turntable and a clamper having four or more projections as recited in claim 2.

Applicants further submit that Kikuchi et al, Kouno et al and Takeuchi et al. are not properly combinable under 35 U.S.C. § 103. There is no teaching or suggestion in Kikuchi et al. to incorporate a sub base installed via elastic bodies to a main base or a ring balancer, as taught by Kouno et al. Such configurations are used respectively, to restrain generation of vibration or correct unbalance and no such issues are raised by Kikuchi. et al. Accordingly, there would no motivation to incorporate the features taught by Kouno et al. into the disk drive taught by Kikuchi et al. Further, there is no teaching or suggestion in Kikuchi et al. to incorporate the balancer taught by Kouno et al. with the segmented balancer taught by Takeuchi et al.

For all the foregoing reason, Applicants submit that the combination of Kikuchi et al., Kouno et al. and Takahashi et al. does not make claim 2 obvious. Accordingly Applicants respectfully request reconsideration and withdrawal of the §103 rejection of claim 2.

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Reply to Office Action of Sept. 15, 2004

Conclusion

Insofar as the Examiner's objections and rejections have been fully addressed, the instant application, including claims 1-4, is in condition for allowance and Notice of Allowability of claims 1-4 is therefore earnestly solicited.

Respectfully submitted,

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